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"Paravaginal Plus" Burch Procedure

A Laparoscopic Approach

Techniques

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The support of the anterior vaginal wall, bladder, and urethra is dependent on the inherent strength of the pubocervical fascia and its peripheral attachment to the pelvic sidewalls. The anterior vaginal fornix and its underlying pubocervical fascia are attached to the sidewall at the arcus tendineus fascia pelvis or the white line overlying the obturator internus muscle. A proximal break in this lateral attachment may result in a cystourethrocele, whereas a distal break in the area of the vesicle neck may result in bladder neck hypermobility with associated stress urinary incontinence.

Often, both entities coexist and present as prolapse and incontinence.[1,2] The repair of this paravaginal defect has been described using various modes of access, including laparotomy,[2,3] laparoscopy,[4] and transvaginal incisions. Surgeons have reported good success in restoring the anatomy using these approaches. However, the literature provides few objective data supporting the paravaginal repair in the cure of stress urinary incontinence.[5]

Despite more than 100 different surgical techniques for the treatment of urinary stress incontinence in the literature, the Burch colposuspension has endured as one of the most successful surgical procedures.[6] Randomized studies involving anterior colporrhaphy and modified Pereyra and Burch procedures in the treatment of anatomic stress incontinence report the Burch to have the highest long-term cure rates.[7]

Several investigators have described laparoscopic approaches to Burch urethropexy with few objective data regarding long-term outcomes.[8,9] In 1998, Ross[10] reported that laparoscopic Burch surgical cure rates were similar to those for laparotomy based on objective postoperative multichannel urodynamic studies.

In this article, we describe a laparoscopic approach to anterior vaginal wall reconstruction. This approach combines the paravaginal repair with the Burch urethropexy for treatment of anterior vaginal prolapse and stress urine incontinence associated with urethral hypermobility.

Evaluation and Preparation

Preoperatively, all patients undergo a complete history and physical examination, which includes detailed pelvic and neurologic examinations and multichannel urodynamic studies. We recommend a modified preoperative bowel preparation consisting of a full-liquid diet and one bottle of magnesium citrate 24 hours before the

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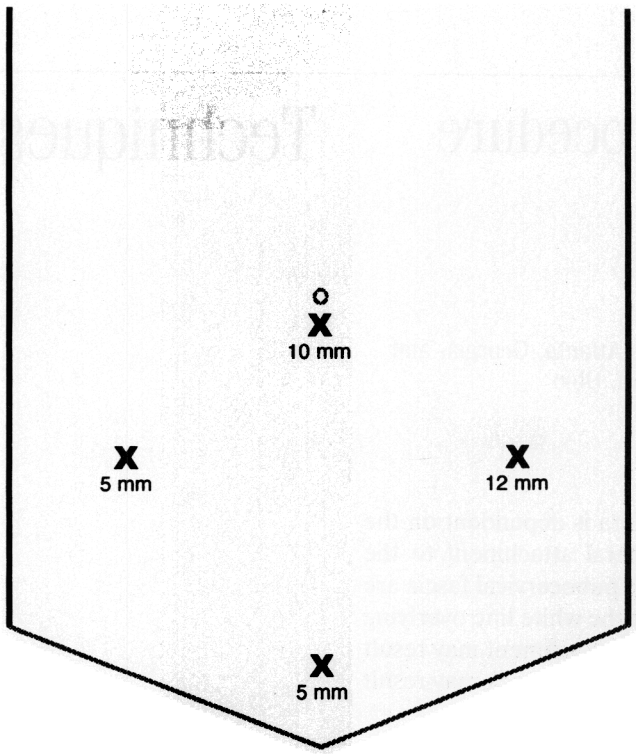

Figure 1. Abdominal trocar placement.

surgery for all patients. This regimen improves visualization of the operative field by bowel decompression and reduces the chance of contamination in case of accidental bowel injury. A single dose of prophylactic intravenous antibiotics is administered 30 minutes before surgery. Antiembolic compression stockings are used routinely.

The patient is administered general anesthesia and placed in the dorsal lithotomy position using Allen stirrups; both arms are tucked to the patient's side. A 16-French three-way Foley catheter with a 30-mL balloon tip is inserted into the bladder and attached to continuous drainage.

Operative Technique

Open laparoscopy is performed on all patients, with minilaparotomy incision in the inferior margin of the umbilicus. A 12-mm access port is used at this site to accommodate the 0°laparoscope. The abdomen is insufflated up to 16–18 mm Hg carbon dioxide.

During entry into the abdomen, inspection of the peritoneal cavity is performed, with identification of the deep inferior epigastric vessels and obliterated umbilical ligaments bilaterally. Any anterior abdominal wall adhe-

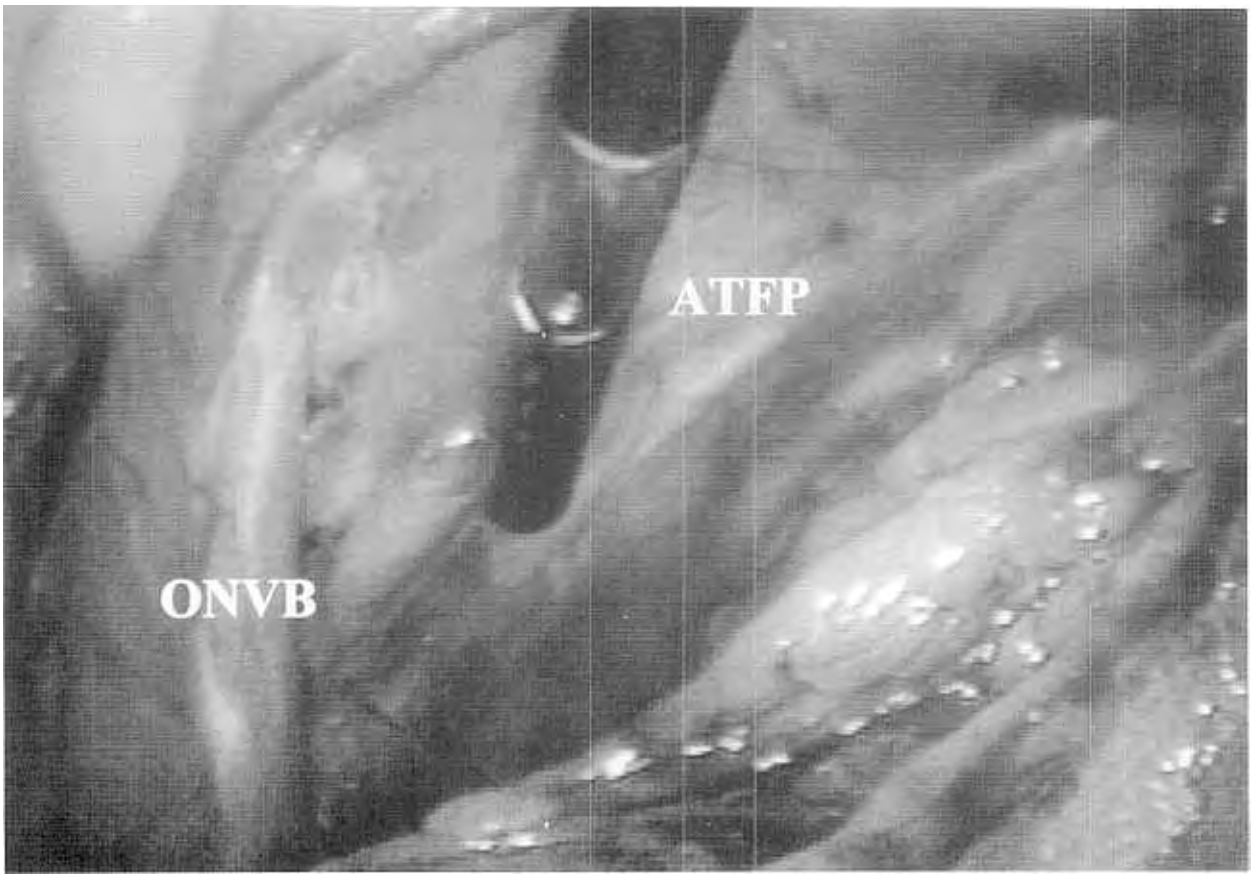

Figure 2. Identification of retropubic structures. Note the obturator neurovascular bundle (ONVB) superior to the ischial spine and its relationship to the arcus tendineus fascia pelvis (ATFP) on the left pelvic sidewall.

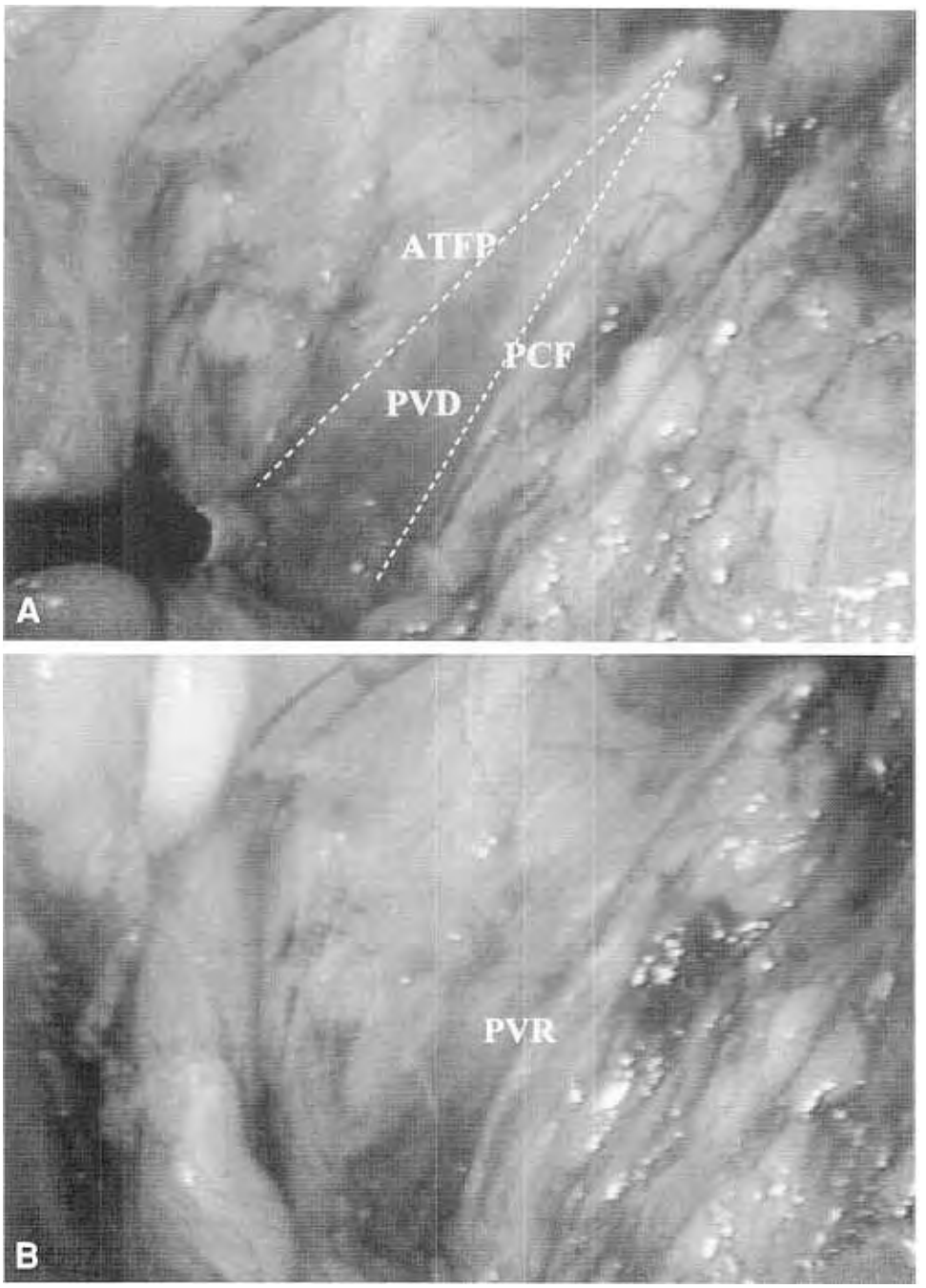

Figure 3. (A) The paravaginal defect (PVD) is identified on the patient's left side with detachment of the pubocervical fascia (PCF) from the arcus tendineus fascia pelvis (ATFP). (B) The surgeon's left hand is inserted into the vagina to reapproximate the pubocervical fascia to the arcus tendineus fascia pelvis and recreate the paravaginal repair (PVR).

sions are lysed as needed. Three other ports are placed under direct vision (Fig. 1). Choice of the individual port size depends on any concomitant surgery planned for each patient.

The bladder is filled in a retrograde fashion with 200–300 mL normal saline, allowing identification of the superior border of the bladder edge. Entrance into the space of Retzius is accomplished by a transperitoneal approach using a harmonic scalpel. The incision is made approximately 3 cm above the bladder reflection, beginning along the medical border of the right obliterated umbilical ligament. Immediate identification of loose areolar tissue at the point of incision confirms a proper plane of dissection.

After the space of Retzius has been entered, the bladder is drained to prevent visceral injury. The retro-

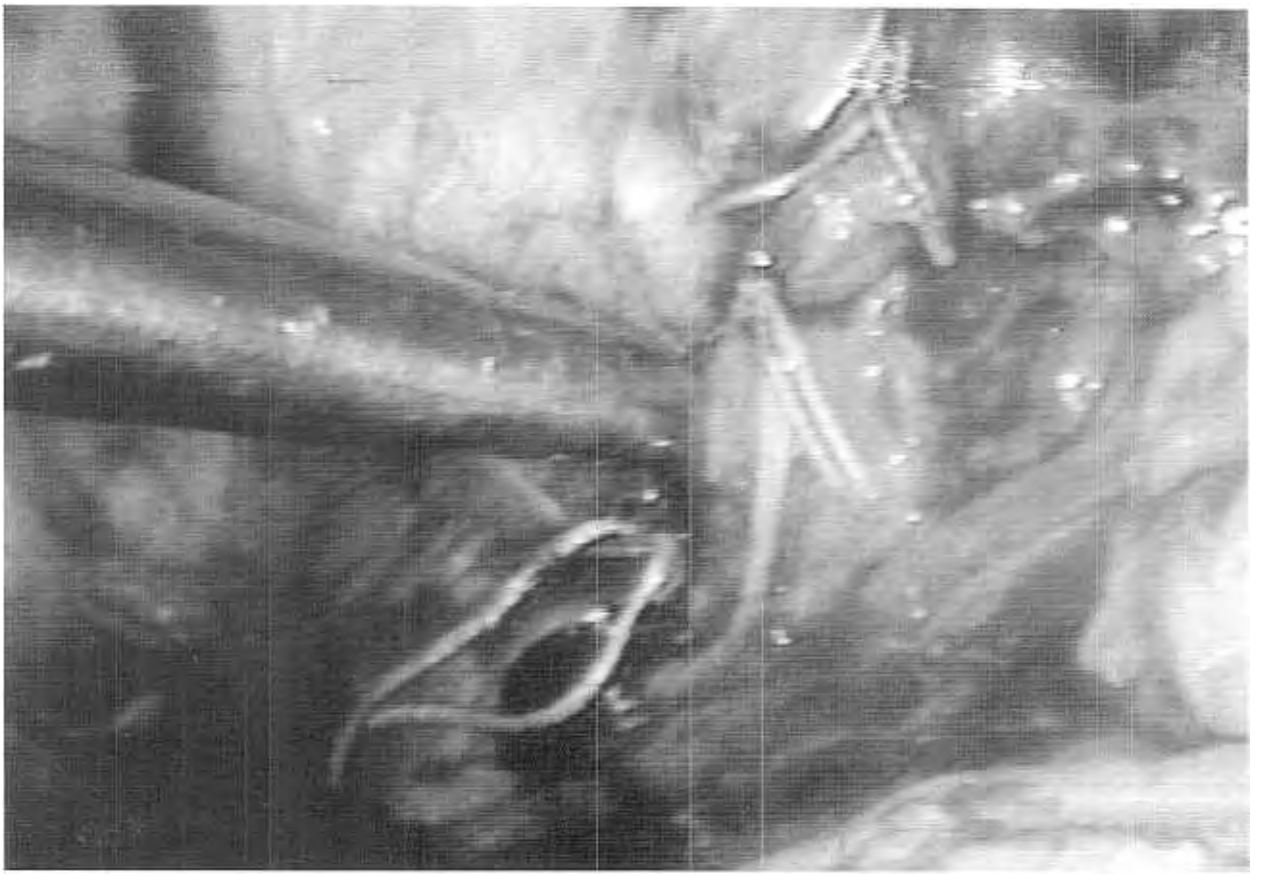

Figure 4. The paravaginal repair is performed with a series of permanent stitches reapproximating the pubocervical fascia (PCF) to the arcus tendineus fascia pelvis (ATFP) from the ischial spine to the vesical neck.

pubic space is developed by separating the loose areolar and fatty layers, using blunt dissection. Blunt dissection is continued until the retropubic anatomy is visualized. The pubic symphysis and bladder neck are identified in the midline and the obturator neurovascular buncle, Cooper's ligament, and the arcus tendineus fascia pelvis are visualized bilaterally along the pelvic sidewall (Fig. 2).

The arcus tendineus should be visualized throughout its course from its origin at the pubic symphysis to insertion at the ischial spine. The pubocervical fascia lateral to the urethra and bladder are exposed on each side using blunt dissection with an endoscopic Kitner. Hemostasis is maintained using the harmonic scalpel and gentle dissection.

After the lateral margins of the detached pubocervical fascia are identified, the paravaginal defects can be visualized (Fig. 3A). Although small discrete detachments of the pubocervical fascia from the arcus tendineus have been noted, it is far more common to find complete paravaginal defects from the ischial spine to the medial aspect of the pubic symphysis. Unilateral or bilateral defects may be present.

The paravaginal repair is performed using 2-0 nonabsorbable suture (Ethibond; Ethicon, Cincinnati, OH), with intracorporeal needle placement and extracorporeal knot tying. The nondominant hand is placed into the vaginal canal to elevate the anterior vaginal wall and the pubocervical fascia to their normal attachment along the arcus tendineus fascia pelvis (Fig. 3B). The sutures are introduced through a 12-mm port, and the needle is grasped using a laparoscopic needle driver.

The first suture is placed near the apex of the vagina through the paravesical portion of the pubocervical fascia. The needle is then passed through the ipsilateral obturator internus muscle and fascia around the arcus tendineus fascia at its origin approximately 1–2 cm distal to the ischial spine. The suture is secured using an extracorporeal knot-tying technique. Good tissue approximation is accomplished without an intervening suture bridge.

Sutures are placed sequentially along the paravaginal defects from the ischial spine toward the urethrovesical junction (Fig. 4). Usually, a series of two to four sutures are placed between the ischial spine and a point 1–2 cm proximal to the urethrovesical junction, allowing space

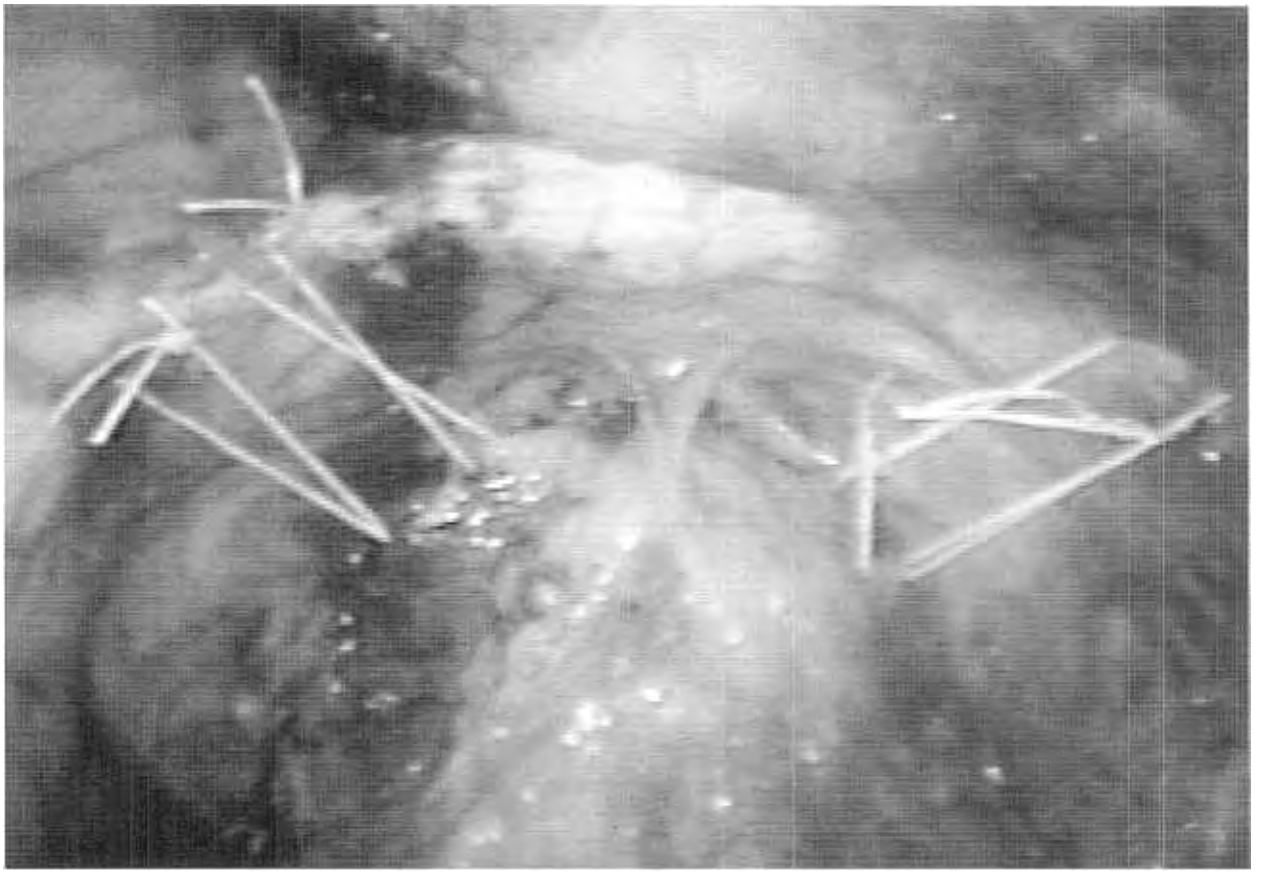

Figure 5. The completed paravaginal plus repair incorporates the paravaginal repair with the Burch colposuspension (white sutures to Cooper's ligament), providing anatomic support to the bladder base for correction of a displacement cystocele and functional support to the bladder neck for treatment of stress incontinence caused by urethral hypermobility.

for placement of the Burch urethropexy sutures. The surgical procedure is repeated on the patients opposite side. At completion of the bilateral paravaginal repair, the Burch urethropexy is performed.

The laparoscopic urethropexy is performed using nonabsorbable No. 0 sutures. The surgeon's nondominant hand is placed in the vagina and a finger is used to elevate the vagina. The first suture is placed 2 cm lateral to the urethra at the level of the midurethra. A double bite, incorporating the entire thickness of the anterior vaginal wall excluding the epithelium, is taken, and then the suture is passed through the ipsilateral Cooper's ligament.

With an assistant's fingers in the vagina to elevate the anterior vaginal wall toward Cooper's ligament, the suture is tied down with a series of extracorporeal knots, using an endoscopic knot pusher. An additional double-bite suture is then placed in a similar fashion at the level of the urethrovesical junction, approximately 2 cm lateral to the viscera, on the same side.

An identical procedure is performed on the contralateral side. Excessive tension on the vaginal wall should be avoided when tying down the sutures, and we routinely leave a suture bridge of approximately 2–3 cm (Fig. 5).

After completion of the Burch urethropexy, the intraabdominal pressure is reduced to 12 mm Hg carbon dioxide, and the retropubic space is inspected for hemostasis. After placement of the urethropexy sutures, we routinely place a cotton swab transurethrally to assess urethral axis. If the cotton swab has a negative deflection of 20° or more, the urethrovesical junction stitches are cut, replaced, and tied with less tension. If the cotton swab has a positive deflection of 10° or more, the urethrovesical sutures are replaced and tied tighter (i.e., shorter suture bridge). Ideally, the cotton swab deflection should be between −20° and 0°.

At completion of the "paravaginal plus" Burch procedure, cystourethroscopy is performed. The patient is administered 5 mL of indigo carmine and 10 mL furosemide intravenously, and a 70° cystoscope is used to visualize the bladder lumen, excluding unintentional stitch penetration and confirming bilateral ureteral patency. After cystoscopy, attention is returned to laparoscopy.

The peritoneal defect created to access the space of Retzius is closed using a multifire hernia stapler. All ancillary trocar sheaths are removed under direct vision to ensure hemostasis and exclude iatrogenic bowel herniation. Excess gas is expelled and fascial defects of 10 mm or more are closed using delayed absorbable suture. Skin incisions are closed with an absorbable suture. A suprapubic catheter is placed, and voiding trials are started on postoperative day 1.

We believe that the laparoscopic approach to surgical correction of the anterior vaginal wall should parallel the techniques of traditional approaches. The paravaginal repair and the Burch urethropexy are proven techniques for correction of cystocele (caused by paravaginal defects) and genuine anatomic stress urine incontinence, respectively.

Historically, the paravaginal repair lacks objective data for the cure of stress urine incontinence, and the Burch urethropexy is the "gold standard." A laparoscopic approach using both techniques is minimally invasive method and restores the anatomy of the anterior vaginal wall while addressing urine stress incontinence. We have performed this procedure during the past 3 years and advocate its use in the surgical treatment of prolapse with coexisting stress urine incontinence.

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